REMARKS

Claims 1-26 are pending in the application. Claims 1-5, 9-13, and 17-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. Claims 6-8 and 14-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Konno in view of Johnson, Jr. in further view of Hamano. Claims 1, 5-8, 10, 13-16, 18, 21, 23 and 25 have been amended, without new matter. Claims 6, 8, 14 and 16 have been canceled. New claim 26 has been added. Reexamination and reconsideration of the application in view of the amendments and the following remarks is respectfully requested.

The present invention as recited in amended claims 1-25 is directed to a zoom lens system that provides and maintains color filtering throughout the full range of zooming. Conventional zoom lens systems were capable of providing color filtering, but as the focal length of the lens changed during zooming, the effects of the color filtering would vary. The present invention solves this problem using an optical filter element located within a zoom lens system such that the color filtering remains substantially constant over the full range of zooming.

The zoom lens system includes a movable zoom lens group located between object space and an optical stop, and a stationary relay lens group located between the optical stop and an image plane. In the present invention, an optical element placed within the zoom lens system modifies the light passing through the zoom lens system to a predetermined spectrum of light rays. A coating on the surface of the optical element acts as an interference filter and produces the predetermined spectrum of light rays.

As Figure 1 of the application illustrates, within a zoom lens system there are numerous locations where an optical element could be placed. However, to achieve a uniform color filtering effect over the entire range of zooming, the placement of the optical element is of critical importance. It must be positioned in the relay lens group between the optical stop and the image plane in a location where the light rays are substantially collimated and perpendicular to the optical element and parallel to an optical axis for any modes of adjustment of the lens elements of the zoom lens system. Such a location is not trivial, because in many locations within the zoom lens system,

the angle of the light rays with respect to each other, the optical element and the optical axis will vary as the lens elements are moved during zooming. Furthermore, some zoom lens systems may not even have a location with these characteristics. To achieve a uniform color filtering effect over the entire range of zooming, the zoom lens system must have been designed to have a location where the light rays are substantially collimated and perpendicular to the optical element and parallel to an optical axis for any modes of adjustment of the lens elements.

Therefore, in summary, to achieve a uniform color filtering effect over the entire range of zooming according to the present invention, the optical element must be precisely placed (1) in a zoom lens system, (2) in a relay lens group between the optical stop and the image plane, (3) where the light rays are substantially collimated and perpendicular to the optical element, and substantially parallel to the optical axis, regardless of the movement of the zoom lens group.

Accordingly, all of the independent claims (claims 1, 10, 18, 23 and 25) have been amended to contain these three limitations, and therefore all of the claims in the application as a whole (claims 1-25) also include these three limitations. Note that the current amendments to claims 1, 10, 18, 23 and 25 added the placement of the optical filter within a relay lens group between the optical stop and the image plane, and the placement of the optical filter such that the light rays are substantially parallel to the optical axis. Both of these limitations are found in the specification (see p. 5 lines 19-22 and p. 9 lines 8-9, respectively). Thus, no new matter has been added.

Claims 1-5, 9-13, and 17-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. With the amendments to claims 1, 5, 10, 13, 18, 21, 23 and 25, it is respectfully submitted that this rejection has been overcome.

With regard to limitation (1) described above, neither Konno nor Johnson, Jr. discloses a zoom lens system. Although the Examiner states "movable lenses that will enable a user to . . . zoom in on the image . . . [are] inherent based on the image depicted in Figure 1," it is

respectfully submitted that the Examiner has read features into Konno that simply do not exist. Figure 1 of Konno shows a lens barrel 6 containing a few representative lens elements. These lens elements are not described. The mere shape of the elements does not suggest that a zoom lens is being depicted. Moreover, nowhere in Konno is the word "zoom" found. There is absolutely no teaching, suggestion or other basis for finding a zoom lens "inherent" in Konno.

Johnson, Jr. discloses an interference filter for producing a predetermined spectrum of light, but only discloses the filter. Johnson, Jr. contains no disclosure at all related to a lens of any type. Needless to say, nowhere in Johnson, Jr. is the word "zoom" found.

Neither Konno nor Johnson, Jr. contain even the slightest hint of the teaching of a zoom lens. The term "zoom lens" is nowhere to be found in either patent. There is no discussion in either patent that touches, even peripherally, on a zoom lens. A drawing of a lens barrel with a few generalized representative elements, without explanation, cannot result in a finding that a zoom lens is inherent in the lens barrel. There is simply no support for that line of reasoning. In fact, using that same unsupported line of reasoning, it could be argued with equal persuasiveness that the lens barrel of Konno inherently discloses a fixed lens. Based on the above, the Applicants respectfully submit that limitation (1) cannot be disclosed, taught or suggested by Konno in view of Johnson, Jr.

With regard to limitation (2) described above, neither Konno nor Johnson, Jr. discloses a relay lens group between the optical stop and the image plane, or locating the optical element in the relay lens group. Konno discloses an optical stop and an image plane, but the only element between the optical stop and the image plane is a single low pass filter 8b. Nowhere in Konno is the term "relay lens group" found, or any other equivalent or similar term. In fact, Konno teaches away from locating the optical element in the relay lens group. The low pass filter 8b is placed in a drop-in filter unit 7, which is not a lens group at all, but merely a structure that holds the low pass filter 8b.

As mentioned above, Johnson, Jr. contains no disclosure at all related to a lens of any type. Not surprisingly, nowhere in Johnson, Jr. is the term "relay lens group" found.

Neither Konno nor Johnson, Jr. contain even the slightest hint of the teaching of a relay lens group. The term "relay lens group" is nowhere to be found in either patent. There is no discussion in either patent that touches, even peripherally, on a relay lens group. Furthermore, Konno teaches away from locating the optical element in a relay lens group. Based on the above, the Applicants respectfully submit that limitation (2) also is not disclosed, taught or suggested by Konno in view of Johnson, Jr.

With regard to limitation (3) described above, neither Konno nor Johnson, Jr. discloses locating the optical element where the light rays are substantially collimated and perpendicular to the optical element, and substantially parallel to the optical axis, regardless of the movement of the zoom lens group. As can be envisioned from Figure 1 of Konno, light rays converging from the larger rightmost lens element in the lens barrel 6 to the smaller image sensor 2 must pass through the surface of filter 8b. Because these light rays are converging, they are not substantially collimated or perpendicular to the filter 8b, nor are they substantially parallel to the optical axis. Moreover, Konno fails to disclose anything regarding "the movement of a zoom lens group." These terms are not found in Konno. Konno does not mention anything about the movement of lens groups, and therefore does not teach anything about locating an optical element where the light rays are substantially collimated and perpendicular to the optical element, and substantially parallel to the optical axis, regardless of the movement of the zoom lens group.

The portion of limitation (3) that reads "regardless of the movement of the zoom lens group" is of critical importance when evaluating Johnson, Jr. Because Johnson, Jr. only discloses an interference filter, and completely fails to disclose, teach or suggest anything related to a lens of any type, it simply cannot teach anything about locating an optical element such that certain characteristics are preserved regardless of the movement of the zoom lens group. Moreover, although Johnson, Jr. does teach using collimation devices to collimate radiation, it

does not teach orienting light rays perpendicular to the optical filter. Merely because light rays are collimated, that does not mean that the light rays are also perpendicular to the optical filter.

The failure of either reference to teach anything about a zoom lens is key. Both are completely silent as to zoom lenses and the movement of a zoom lens group. While Johnson, Jr. does teach locating an optical element where the light rays are substantially collimated, neither reference goes on to teach a location of the optical element where the light rays are substantially collimated and perpendicular to the optical element, and substantially parallel to the optical axis, regardless of the movement of the zoom lens group. Such a teaching is simply impossible given that both Konno and Johnson, Jr. do not discuss zoom lenses at all. Based on the above, the Applicants respectfully submit that limitation (3) also cannot be found in Konno in view of Johnson, Jr.

As demonstrated above, neither Konno nor Johnson, Jr., alone or in combination, disclose, teach or suggest any of the three limitations of independent claims 1, 10, 18, 23 and 25 recited above. Therefore, it is respectfully submitted that the rejection of claims 1, 10, 18, 23 and 25 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome. In addition, because claims 2-5 and 9 depend from amended claim 1, claims 11-13 and 17 depend from claim 10, and claims 19-22 and 24 depend from claim 18, the rejection of those claims under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome for the same reasons provided above with respect to claims 1, 10, 18, 23 and 25.

Claims 6-8 and 14-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Konno in view of Johnson, Jr. in further view of Hamano. Claims 6, 8, 14 and 16 have been canceled. With the amendments to claims 1 and 10, it is respectfully submitted that the rejection of the remaining claims has been overcome.

Claim 7 depends from independent claim 1, and claim 15 depends from independent claim 10. As discussed above, neither Konno nor Johnson, Jr. discloses, teaches or suggest limitations (1) through (3) found in claims 1 and 10.

With regard to limitation (2), Hamano also fails to disclose locating the optical element within a relay lens group between the optical stop and the image plane. Hamano teaches that in zoom lens embodiments, the low pass filter 1 must be located on the object space side of the aperture diaphragm 2, close to the aperture diaphragm and away from the magnification section 4 in order to minimize the change in the image separation width of the low pass filter (see FIG. 1 and col. 4 lines 52-55). Hamano therefore fact teaches away from locating an optical element between the optical stop and the image plane. Hamano also contains no reference to a "relay lens group," and therefore fails to teach an optical element located in the relay lens group. In fact, the closest thing to a relay lens group in Hamano is the image forming lens unit 7, and the low-pass filter is illustrated and described as being located outside of the image forming lens unit 7. Based on the above, the Applicants respectfully submit that limitation (2) is not disclosed, taught or suggested in Konno in view of Johnson, Jr. in further view of Hamano.

With regard to limitation (3), Hamano also fails to disclose placing the optical element where the light rays are substantially collimated and perpendicular to the optical element, and substantially parallel to the optical axis, regardless of the movement of the zoom lens group. As can be envisioned from Figures 1, 4 and 6 of Hamano, light rays diverging from the smaller diameter lens unit to the left of the low-pass filter 1 to the larger diameter lens unit to the right of the low-pass filter 1 must pass through the surface of the low-pass filter 1. Because these light rays are diverging, they are not substantially collimated or perpendicular to the low-pass filter 1, nor are they substantially parallel to the optical axis. Similarly, as can be envisioned from Figure 5 of Hamano, light rays converging from the larger diameter lens unit to the left of the low-pass filter 1 to the smaller diameter lens unit to the right of the low-pass filter 1 must pass through the surface of the low-pass filter 1. Because these light rays are converging, they are not substantially collimated or perpendicular to the low-pass filter 1, nor are they substantially parallel to the optical axis.

In fact, Hamano provides completely different criteria for locating the low-pass filter. According to Hamano, the low-pass filter must be placed where a change in the image separation width δ is the smallest. Therefore, Hamano actually teaches away from placing the optical element where the light rays are substantially collimated and perpendicular to the optical element, and substantially parallel to the optical axis, regardless of the movement of the zoom lens group. Based on the above, the Applicants respectfully submit that limitation (3) is not disclosed, taught or suggested by Konno in view of Johnson, Jr. in further view of Hamano.

As demonstrated above, neither Konno nor Johnson, Jr. nor Hamano, alone or in combination, disclose, teach or suggest all three limitations of claims 7 and 15 recited above. Therefore, it is respectfully submitted that the rejection of claims 7 and 15 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. in further view of Hamano has been overcome.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

If, for any reason, the Examiner finds the application other than in condition for allowance, Applicants request that the Examiner contact the undersigned attorney at the Los Angeles telephone number (213) 892-5752 to discuss any steps necessary to place the application in condition for allowance.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicants petition for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 490962001000.

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Respectfully submitted,

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